

REMARKS

The Examiner's indication that claims 2-6, 8-11, and 13-14 would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims, and with remediation of the alleged indefiniteness of claims 1, 16, and 22 under 35 USC 112, second paragraph.

In order to expedite prosecution and to emphasize the patentable distinctions of applicant's invention over the prior art, the limitations formerly recited by claim 2 have been incorporated into claim 1, from which claim 2 originally depended. Claim 2 has been cancelled. For the sake of clarity, claims 3-6, which formerly depended from claim 2, have been amended to depend from amended claim 1. For the sake of clarity, claim 16 has been amended to recite an electric motor that directly drives the fiber, and further, to depend from claim 15 to provide antecedent basis for the electric motor. Claim 22 has been amended to depend from claim 18, instead of from itself. In addition, claim 22 has been amended to call for an axial piezoelectric actuator adapted to drive one of the optical fibers in a direction along the common fiber axis.

Each of the foregoing amendments is clearly supported by the original specification; particularly at page 8, line 22 to page 9, line 2; page 9, lines 16-22; and page 18, lines 23-25. Consequently, no new matter has been added.

The Examiner has objected to claim 22 as being informal, inasmuch as the claim depends on itself. As set forth hereinabove, claim 22 has been amended to depend

from claim 18. It is thus submitted that any informality in the dependency of claim 22 has thereby been obviated. Reconsideration of the objection to claim 22 as being informal is thus respectfully requested.

Objection was raised to claims 2-6, 8-11, and 13-14 as being dependent from a rejected base claim, but the Examiner has indicated that the subject matter of said claims would be allowable if presented in independent form including all the limitations of the base claim and any intervening claims. In view of the amendment to claim 1 incorporating the limitations of claim 2 from which it previously depended, and the cancellation of claim 2, reconsideration of the objection to claims 2-6, 9-11, and 13-14 as being dependent on a rejected base claim is respectfully requested.

Claims 1, 16, and 22 were rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner has stated that claims 1 and 16 are narrative in form and replete with indefinite and functional or operational language. In particular, the Examiner has pointed to the limitations “non-coincidental” *[sic]* in claim 1 and “gearlessly” in claim 16. Claim 22 was said to be ambiguous, it being alleged that “common fiber direction” is undefined as to whether common direction means the same/common axis of the optical fibers or x, y, or z direction.

Applicants respectfully submit that the courts have repeatedly held that the recitation of an apparatus using functional limitations are not *per se* indefinite under 35 USC 112, second paragraph. Rather, functional limitations must be evaluated on a case-by-case basis to determine whether the scope of the claim would be clearly understood by a person having ordinary skill in the relevant art.

In the present instance, it is respectfully submitted that the term “non-coincident” used in claim 1, when read in light of applicants’ teaching at page 19, lines 14-22 and page 20, line 14 to page 21, line 2 of the specification, possesses the required clarity and is a structural, not functional term. More specifically, the term is used in an ordinary, geometrical sense with respect to the first and second imaging directions. Those directions are “non-coincident.” That is to say, the directions are not “coincident” – they do not “coincide” and so are not “collinear” or the same directions. See *Webster’s Third New International Dictionary: Unabridged* (1993) at 441: “coincident: having the same position, direction, or setting.” In a preferred embodiment of the claimed splicing stage, the first and second imaging directions are mutually orthogonal, i.e. perpendicular. Applicants respectfully submit that a person having ordinary skill in the optical apparatus arts would understand that the terminology used requires the two imaging directions to intersect at an angle, in order to provide the required lateral resolution needed to bring the respective fibers being joined into collinearity. Therefore, it is maintained that the term “non-coincident” does

not result in any lack of clarity under which claim 1 could properly be rejected under 35 USC 112, second paragraph.

As set forth hereinabove, claim 16 has been amended to recite an electric motor configured to directly drive the fiber. It is submitted that a direct drive motor system, i.e. a motor configured to drive the fiber secured in a holding means gearlessly (without an intervening gear train) affords virtual elimination of the backlash that ordinarily afflicts any drive system that employs a geared connection. As taught by the specification, e.g. at page 18, lines 23-25, such backlash markedly decreases the accuracy of positioning effected by a geared drive and often necessitates a more complicated driving sequence needed to recover at least some of the lost accuracy.

Claim 22 has been amended to recite an axial piezoelectric actuator adapted to drive one of the optical fibers in a direction along the common fiber axis. It is respectfully submitted that the term “common fiber axis” finds antecedent basis in feature (b) of claim 1, from which claim 22 depends indirectly. In particular, the fibers being spliced are brought into coaxial (i.e., collinear) abutment that disposes the abutting end portions of the fibers, which are substantially linear, along a single common fiber axis thus defined. It is respectfully submitted that any ambiguity attending the use of the term “common fiber direction” in claim 22 as originally presented is thereby obviated. The Examiner’s helpful comments with respect to claim 22 are acknowledged with appreciation.

In view of the amendment of claims 16 and 22 and the foregoing remarks, applicant maintains that the scope of claims 1, 16, and 22, as amended, would be understood by the person of ordinary skill, thereby satisfying the definiteness requirement of 35 USC 112, second paragraph.

Accordingly, reconsideration of the rejection of claims 1, 16, and 22 (and claims 2-15 and 17-21 dependent on claim 1) under 35 USC 112, second paragraph, is respectfully requested.

Claims 1, 7, 12, and 15-22 were rejected under 35 USC 103(a) as being unpatentable over US Patent Publication No. US 2002/0159724 to Oki et al., which provides a method and apparatus for fusion-splicing polarization maintaining optical fibers.

As set forth hereinabove, claim 1 has been amended to incorporate the limitations formerly recited by claim 2, which the Examiner has indicated to be patentable over the art of record. Applicants thus maintain claim 1, as amended, is now patentable. Inasmuch as claims 7, 12, and 15-22 depend either directly or indirectly from claim 1, they, too, are submitted to be patentable over Oki et al. for at least the same reasons.

In view of the amendment of claims 1 and 16 and the foregoing remarks, it is respectfully submitted that the low profile splicing stage delineated by applicant's claims 1, 7, 12, and 15-22, as amended, is not rendered obvious by Oki et al.

Accordingly, reconsideration of the rejection of claims 1, 7, 12, and 15-22 under 35 USC 103(a) as being obvious over Oki et al. is respectfully requested.

Claims 1, 7, 12, 15-18, and 22 were rejected under 35 USC 103(a) as being unpatentable over US Patent 6,046,789 to Zamzow. Applicants presume that the Examiner intended to cite USP 6,046,798, as delineated on Form PTO-892 that accompanied the instant Office Action, instead of USP 6,046,789, which is directed to unrelated subject matter.

As set forth above in connection with the rejection over Oki et al., it is submitted that claim 1 has been rendered patentable over the art of record, including Zamzow, by incorporation of the limitations formerly recited by claim 2. Inasmuch as claims 7, 12, 15-18, and 22 are all directly or indirectly dependent from claim 1, they are submitted to be patentable over Zamzow for at least the same reasons.

Accordingly, reconsideration of the rejection of claims 1, 7, 12, 15-18, and 22 under 35 USC 103(a) as being unpatentable over Zamzow is respectfully requested.


The Examiner has further cited US Patent Publication No. 2002/0131729 to Higgins, III; US Patent No. 6,206,583 to Hishikawa et al.; US Patent No. 5,904,413 to Ruegenberg et al.; US Patent No. 5,611,015 to Tokumaru et al.; US Patent No. 5,561,728 to Kobayashi et al.; US Patent No. 5,013,345 to Itoh et al. as being pertinent, but has not applied any of these references. Clearly, the subject matter of amended claims 1 and 3-22 is not disclosed or suggested by these references, whether taken singly or in any combination thereof.

In view of the amendment to claims 1, 3-6, 16, and 22, the cancellation of claim 2, and the foregoing remarks, it is respectfully submitted that the present application has been placed in allowable condition. Reconsideration of the rejection of claims 1-22, and allowance of the present application, as delineated by amended claims 1 and 3-22, are, therefore, earnestly solicited.

Respectfully submitted,

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